

## **Abstract**

### **ANTENNAS SUPPORTING HIGH DENSITY OF WIRELESS USERS IN SPECIFIC DIRECTIONS**

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A low cost antenna in a base station suitable for deployment where high density of wireless users are present in specific directions (e.g., cross roads in urban areas). A lens is used associated with antenna elements to collimate the beam for a longer distance in the desired directions. By using the lens, the need for complex electronics is minimized, thereby reducing the cost of a base station. Another aspect of the present invention enables the lens to be designed precisely by first determining the radiation pattern of each array element according to a corresponding coordinate system, transforming the radiation pattern to a common coordinate system, and determining a composite radiation pattern using the value determined for the common coordinate system. Inverse scattering technique is applied using the composite radiation pattern and the desired collimation pattern to determine the precise shape of the lens.